

FCC Report (Bluetooth)

Product Name : bluetooth headset
Trade mark : SOUNDPEATS
Model No. : H1/H2/H3/H1 SE/H2 SE/H3 SE/H1 Pro/
H2 Pro/H3 Pro/Truengine 3 HSE
FCC ID : 2AFTU-DD013
Report Number : BLA-EMC-202009-A81-03
Date of sample receipt : 2020/9/24
Date of Test : 2020/9/24 - 2020/11/16
Date of Issue : 2020/11/26
Test standard : FCC CFR Title 47 Part 15 Subpart C Section
15.247
Test result : PASS

Prepared for:

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Approved by: <i>Emen-li</i>	Date:2020/11/26



2 Version

Version No.	Date	Description
00	2020/11/26	Original

BlueAsia

4 Test Summary

Test Item	Section in CFR 47	Result
Antenna requirement	15.203/15.247 (c)	Pass
AC Power Line Conducted Emission	15.207	Pass
Conducted Output Power	15.247 (b)(3)	Pass
Channel Bandwidth	15.247 (a)(2)	Pass
Power Spectral Density	15.247 (e)	Pass
Band Edge	15.247(d)	Pass
Spurious Emission	15.205/15.209	Pass

Pass: The EUT complies with the essential requirements in the standard.

Remark: Test according to ANSI C63.10:2013.

Measurement Uncertainty

Test Item	Frequency Range	Measurement Uncertainty	Notes
Radiated Emission	9kHz ~ 30MHz	± 4.34dB	(1)
Radiated Emission	30MHz ~ 1000MHz	± 4.24dB	(1)
Radiated Emission	1GHz ~ 26.5GHz	± 4.68dB	(1)
AC Power Line Conducted Emission	0.15MHz ~ 30MHz	± 3.45dB	(1)

Note (1): The measurement uncertainty is for coverage factor of k=2 and a level of confidence of 95%.

5 General Information

5.1 General Description of EUT

Product Name:	bluetooth headset
Model No.:	H1/H2/H3/H1 SE/H2 SE/H3 SE/H1 Pro/ H2 Pro/H3 Pro/Truengine 3 HSE
Test Model No.:	H1
Serial No.:	H2/H3/H1 SE/H2 SE/H3 SE/H1 Pro/ H2 Pro/H3 Pro/Truengine 3 HSE
Sample(s) Status	Engineer sample
Hardware:	EBT5107_L_QCC3040_V2.0-20200820 EBT5107_R_QCC3040_V2.0-20200820
Software:	0.0.3
Operation Frequency:	2402MHz-2480MHz
Channel Numbers:	40
Channel Separation:	2MHz
Modulation Type:	GFSK
Antenna Type:	Internal Antenna
Antenna Gain:	-1.9dBi
Power Supply:	DC 3.7V
Remark:The Antenna Gain is supplied by the customer.BlueAsia is not responsible for this data	

Operation Frequency each of channel							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
1	2402MHz	11	2422MHz	21	2442MHz	31	2462MHz
2	2404MHz	12	2424MHz	22	2444MHz	32	2464MHz
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
9	2418MHz	19	2438MHz	29	2458MHz	39	2478MHz
10	2420MHz	20	2440MHz	30	2460MHz	40	2480MHz

Note:

In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

Channel	Frequency
The lowest channel	2402MHz
The middle channel	2442MHz
The Highest channel	2480MHz

5.2 Test mode

Transmitting mode	Keep the EUT in continuously transmitting mode with modulation
<i>Remark: During the test, the test voltage was tuned from 85% to 115% of the nominal rated supply voltage, and found that the worst case was under the nominal rated supply condition. So the report just shows that condition's data. Full battery is used during all test except ac conducted emission</i>	

5.3 Description of Support Units

Manufacturer	Description	Model	Serial Number
UGREEN	Adapter	CD112	20358
Lenovo	Notebook computer	E470C	PF-10FB5C

5.4 Test Facility

<p>The test facility is recognized, certified, or accredited by the following organizations:</p> <ul style="list-style-type: none"> ● FCC — Designation No.: CN1252 <i>BlueAsia of Technical Services(Shenzhen) Co., Ltd</i> has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in files. Designation CN1252. ● ISED — CAB identifier No.: CN0028 <i>BlueAsia of Technical Services(Shenzhen) Co., Ltd</i> has been registered by Certification and Engineering Bureau of ISED for radio equipment testing with CAB identifier CN0028

5.5 Test Location

All tests were performed at:
All tests were performed at: BlueAsia of Technical Services(Shenzhen) Co., Ltd. IOT Test Centre of BlueAsia No. 448 Bulong Road, Bantian Street, Longgang District, Shenzhen, China Telephone: TEL: +86-755-28682673 FAX: +86-755-28682673 No tests were sub-contracted.

6 Test Instruments list

Radiated Emission:						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	3m SAC	SKET	9m*6 m*6m	966	06-10-2018	06-09-2023
2	Broadband Antenna	SCHWARZBECK	VULB9168	00836 P:00227	07-13-2020	07-12-2021
					07-13-2020	07-12-2021
3	Horn Antenna	SCHWARZBECK	9120D	01892 P:00331	07-13-2020	07-12-2021
					07-13-2020	07-12-2021
4	EMI Test Software	EZ	EZ	N/A	N/A	N/A
5	Pre-amplifier	SKET	N/A	N/A	07-13-2020	07-12-2021
					07-13-2020	07-12-2021
6	Spectrum analyzer	Rohde & Schwarz	FSP40	100817	07-13-2020	07-12-2021
					07-13-2020	07-12-2021
7	EMI Test Receiver	Rohde & Schwarz	ESR7	101199	07-13-2020	07-12-2021
					07-13-2020	07-12-2021
8	Controller	SKET	N/A	N/A	N/A	N/A
9	Vector Signal Generator	Agilent	E4438C	MY45092582	05-24-2020	05-23-2021
10	Signal Generator	Agilent	E8257D	MY44320250	05-24-2020	05-23-2021

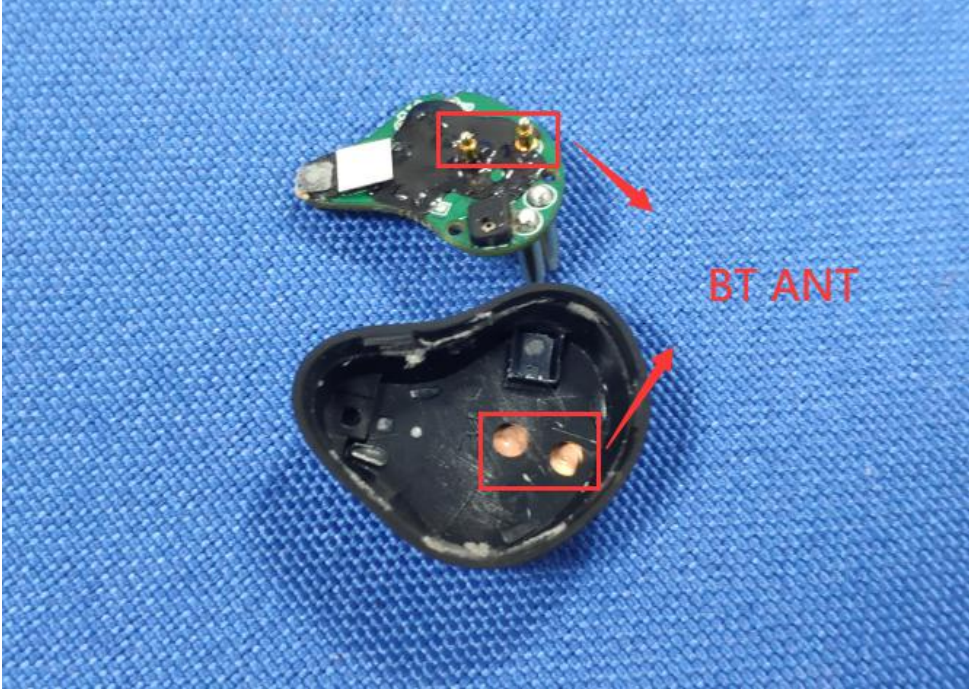
Conducted Emission						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	EMI Test Receiver	Rohde & Schwarz	ESPI3	101082	06-10-2020	06-09-2021
2	LISN	CHASE	MN2050D	1447	06-10-2020	06-09-2021
3	LISN	Rohde & Schwarz	ENV216	3560.6550.15	06-10-2020	06-09-2021
4	EMI Test Software	EZ	EZ	N/A	N/A	N/A
5	Temperature Humidity Chamber	Mingle	TH101B	N/A	07-19-2020	07-18-2021
					07-19-2020	07-18-2021

RF Conducted Test:						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	Spectrum Analyzer	Agilent	N9030A	MY50510123	05-24-2020	05-23-2021
2	Spectrum analyzer	Rohde & Schwarz	FSP40	100817	05-24-2020	05-23-2021
3	Vector Signal Generator	Agilent	E4438C	MY45092582	05-24-2020	05-23-2021
4	Signal Generator	Agilent	E8257D	MY44320250	05-24-2020	05-23-2021
5	Power Sensor	D.A.R.E	RPR3006W	17I00015SNO27	05-24-2020	05-23-2021
6	Power Sensor	D.A.R.E	RPR3006W	17I00015SNO28	05-24-2020	05-23-2021
7	DC Power Supply	LODESTAR	LP305DE	N/A	07-19-2020	07-18-2021
					07-19-2020	07-18-2021
8	Temperature Humidity Chamber	Mingle	TH101B	N/A	07-19-2020	07-18-2021
					07-19-2020	07-18-2021

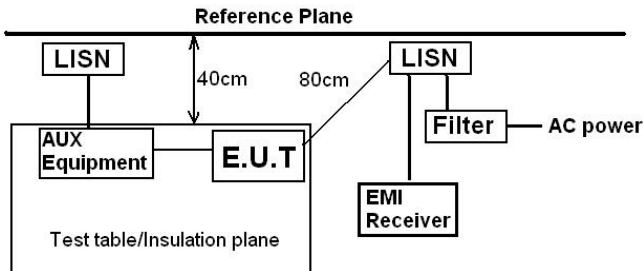
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7 Test results and Measurement Data

7.1 Antenna requirement

Standard requirement:	FCC Part15 C Section 15.203 /247(c)
<p>15.203 requirement: An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.</p> <p>15.247(c) (1)(i) requirement: (i) Systems operating in the 2400-2483.5 MHz band that is used exclusively for fixed. Point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6dBi.</p>	
E.U.T Antenna:	
<p><i>The antenna is Internal antenna, the best case gain of the antenna is -1.9dBi</i></p> 	

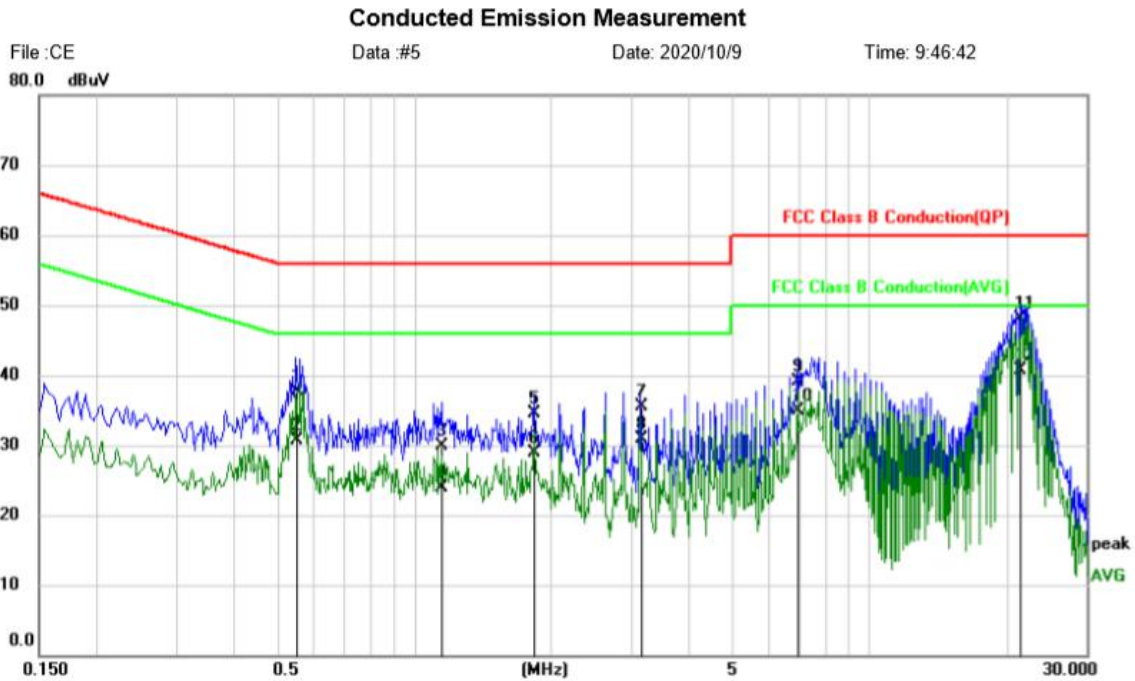
7.2 Conducted Emissions

Test Requirement:	FCC Part15 C Section 15.207														
Test Method:	ANSI C63.10:2013														
Test Frequency Range:	150KHz to 30MHz														
Class / Severity:	Class B														
Receiver setup:	RBW=9KHz, VBW=30KHz, Sweep time=auto														
Limit:	<table border="1"> <thead> <tr> <th rowspan="2">Frequency range (MHz)</th> <th colspan="2">Limit (dBuV)</th> </tr> <tr> <th>Quasi-peak</th> <th>Average</th> </tr> </thead> <tbody> <tr> <td>0.15-0.5</td> <td>66 to 56*</td> <td>56 to 46*</td> </tr> <tr> <td>0.5-5</td> <td>56</td> <td>46</td> </tr> <tr> <td>5-30</td> <td>60</td> <td>50</td> </tr> </tbody> </table> <p>* Decreases with the logarithm of the frequency.</p>	Frequency range (MHz)	Limit (dBuV)		Quasi-peak	Average	0.15-0.5	66 to 56*	56 to 46*	0.5-5	56	46	5-30	60	50
Frequency range (MHz)	Limit (dBuV)														
	Quasi-peak	Average													
0.15-0.5	66 to 56*	56 to 46*													
0.5-5	56	46													
5-30	60	50													
Test setup:	 <p><i>Remark</i> E.U.T: Equipment Under Test LISN: Line Impedance Stabilization Network Test table height=0.8m</p>														
Test procedure:	<ol style="list-style-type: none"> 1. The E.U.T and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm/50uH coupling impedance for the measuring equipment. 2. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs). 3. Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10:2013 on conducted measurement. 														
Test Instruments:	Refer to section 6.0 for details														
Test mode:	Refer to section 5.2 for details														
Test results:	Pass														

Measurement data

Line:

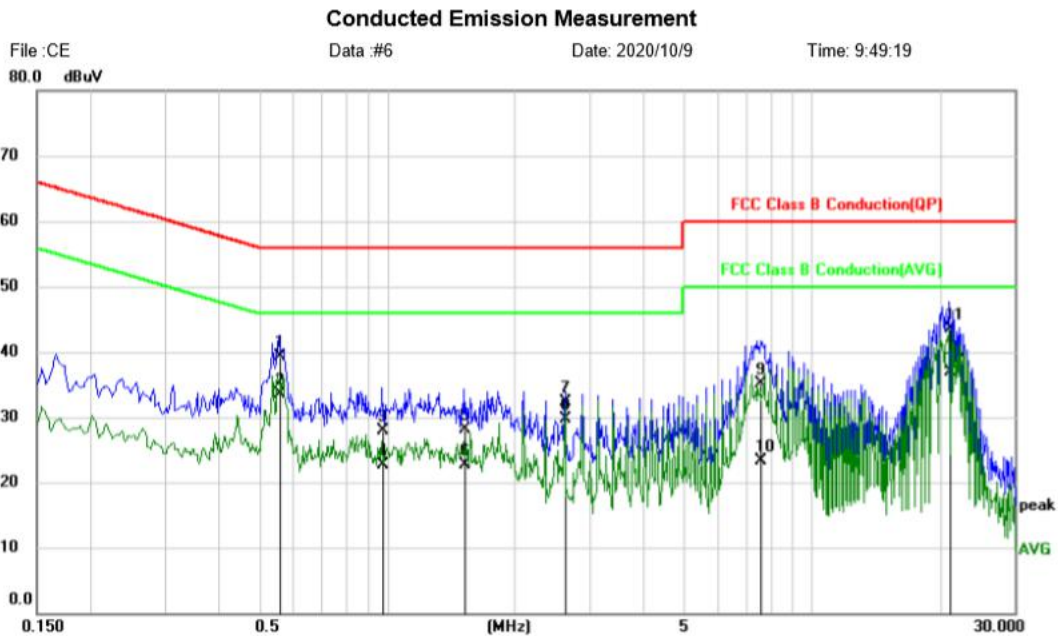
EUT:	bluetooth headset	Probe:	L1
Model:	H1	Power Source:	AC120V/60Hz
Mode:	BT mode	Test by:	Eason
Temp./Hum.(%RH):	23°C/49%RH		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector
		MHz	dBuV	dB	dBuV	dBuV	dB	
1		0.5500	27.90	9.74	37.64	56.00	-18.36	QP
2		0.5500	20.94	9.74	30.68	46.00	-15.32	AVG
3		1.1500	20.02	9.83	29.85	56.00	-26.15	QP
4		1.1500	14.12	9.83	23.95	46.00	-22.05	AVG
5		1.8380	24.71	9.83	34.54	56.00	-21.46	QP
6		1.8380	19.01	9.83	28.84	46.00	-17.16	AVG
7		3.1500	25.67	9.87	35.54	56.00	-20.46	QP
8		3.1500	21.13	9.87	31.00	46.00	-15.00	AVG
9		6.9580	29.31	9.86	39.17	60.00	-20.83	QP
10		6.9580	25.05	9.86	34.91	50.00	-15.09	AVG
11		21.3940	38.12	10.01	48.13	60.00	-11.87	QP
12	*	21.3940	30.75	10.01	40.76	50.00	-9.24	AVG

Neutral:

EUT:	bluetooth headset	Probe:	N
Model:	H1	Power Source:	AC120V/60Hz
Mode:	BT mode	Test by:	Eason
Temp./Hum.(%RH):	23°C/49%RH		

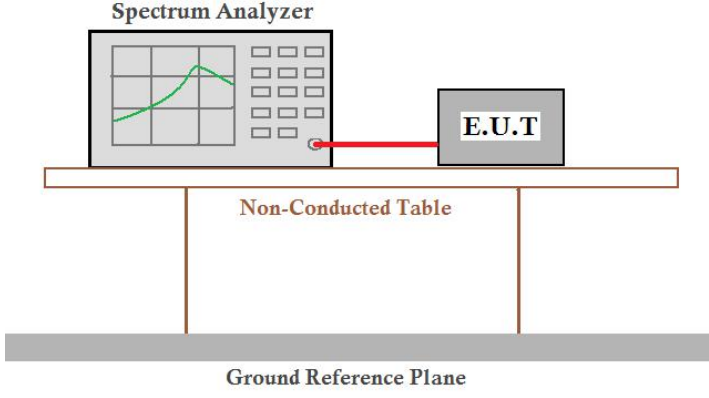


No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector
1		0.5580	29.62	9.73	39.35	56.00	-16.65	QP
2	*	0.5580	23.86	9.73	33.59	46.00	-12.41	AVG
3		0.9780	18.17	9.78	27.95	56.00	-28.05	QP
4		0.9780	12.95	9.78	22.73	46.00	-23.27	AVG
5		1.5220	18.21	9.83	28.04	56.00	-27.96	QP
6		1.5220	12.81	9.83	22.64	46.00	-23.36	AVG
7		2.6260	22.43	9.87	32.30	56.00	-23.70	QP
8		2.6260	19.82	9.87	29.69	46.00	-16.31	AVG
9		7.5980	25.19	9.85	35.04	60.00	-24.96	QP
10		7.5980	13.43	9.85	23.28	50.00	-26.72	AVG
11		21.1380	33.43	10.05	43.48	60.00	-16.52	QP
12		21.1380	26.93	10.05	36.98	50.00	-13.02	AVG

Notes:

1. An initial pre-scan was performed on the line and neutral lines with peak detector.
2. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
3. *Final Level = Receiver Read level + Correct factor*
4. *Correct factor = LISN Factor + Cable Loss*
5. *If the average limit is met when using a quasi-peak detector receiver, the EUT shall be deemed to meet both limits and measurement with the average detector receiver is unnecessary.*

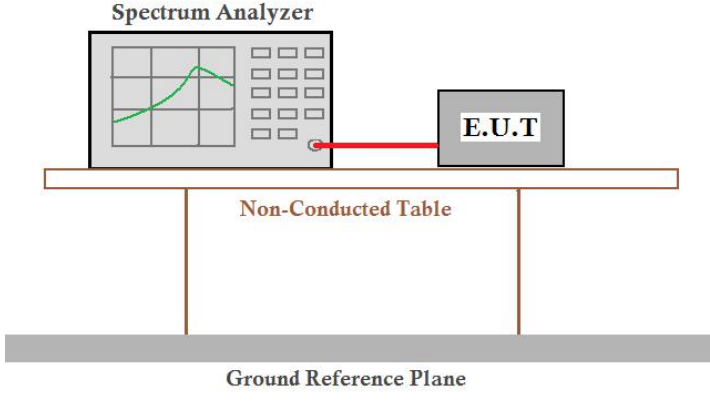
7.3 Conducted Output Power

Test Requirement:	FCC Part15 C Section 15.247 (b)(3)
Test Method:	ANSI C63.10:2013 and KDB558074 D01 DTS Meas Guidance V05
Limit:	30dBm
Test setup:	 <p>The diagram illustrates the test setup. A Spectrum Analyzer is connected to an E.U.T. (Equipment Under Test) via a red cable. Both are placed on a Non-Conducted Table, which is supported by a Ground Reference Plane.</p>
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

Measurement Data

AppendixC: Maximum conducted output power

7.4 Channel Bandwidth

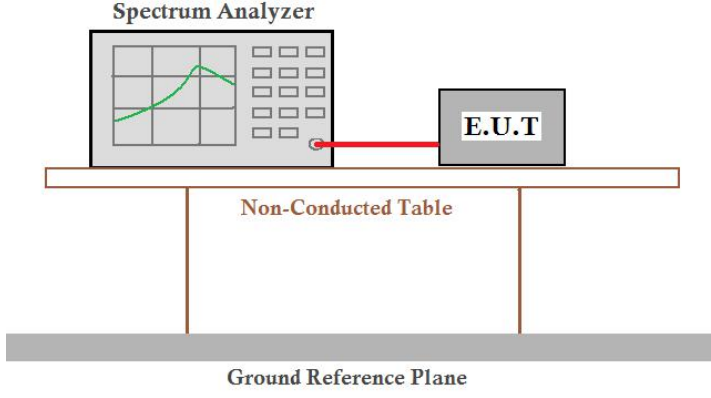
Test Requirement:	FCC Part15 C Section 15.247 (a)(2)
Test Method:	ANSI C63.10:2013 and KDB558074 D01 DTS Meas Guidance V05
Limit:	>500KHz
Test setup:	 <p>The diagram illustrates the test setup. A Spectrum Analyzer is connected via a red cable to an E.U.T. (Equipment Under Test). Both are placed on a Non-Conducted Table. Below the table is a Ground Reference Plane.</p>
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

Measurement Data

AppendixA: DTS Bandwidth

AppendixB: Occupied Channel Bandwidth

7.5 Power Spectral Density

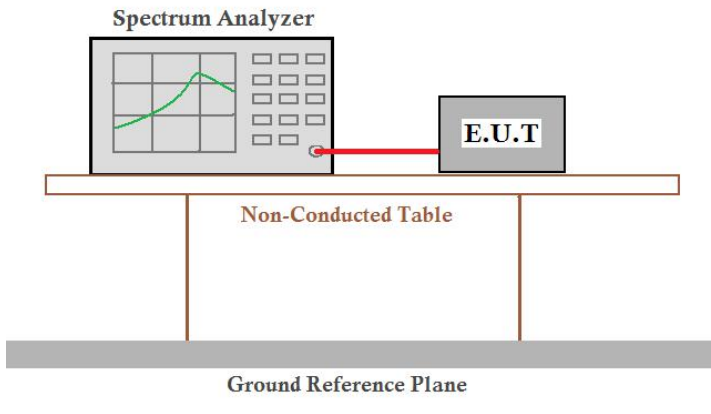
Test Requirement:	FCC Part15 C Section 15.247 (e)
Test Method:	ANSI C63.10:2013 and KDB558074 D01 DTS Meas Guidance V05
Limit:	8dBm/3kHz
Test setup:	 <p>The diagram illustrates the test setup. A Spectrum Analyzer is connected to an E.U.T. (Equipment Under Test) via a red cable. Both are placed on a Non-Conducted Table, which is supported by a Ground Reference Plane.</p>
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

Measurement Data

AppendixD: Maximum power spectral density

7.6 Band edges

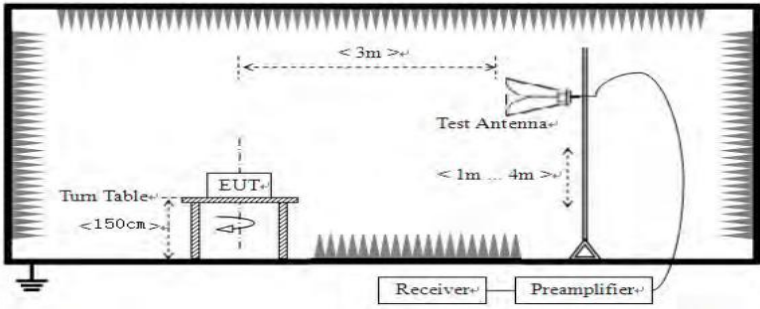
7.6.1 Conducted Emission Method

Test Requirement:	FCC Part15 C Section 15.247 (d)
Test Method:	ANSI C63.10:2013 and KDB558074 D01 DTS Meas Guidance V05
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.
Test setup:	 <p>The diagram illustrates the test setup. A Spectrum Analyzer is connected to an E.U.T. (Equipment Under Test) via a red cable. Both are placed on a Non-Conducted Table, which is supported by a Ground Reference Plane.</p>
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

Measurement Data

AppendixE:Band edge measurements

7.6.2 Radiated Emission Method

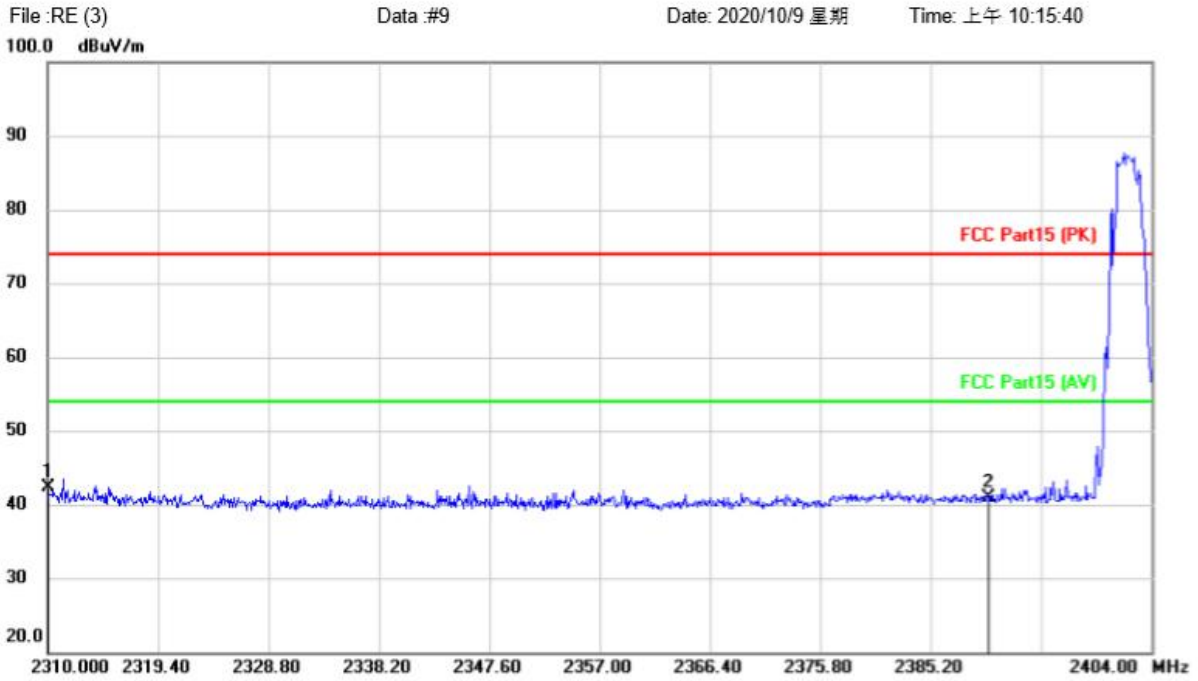
Test Requirement:	FCC Part15 C Section 15.209 and 15.205				
Test Method:	ANSI C63.10:2013				
Test Frequency Range:	All of the restrict bands were tested, only the worst band's (2310MHz to 2390MHz, 2483.5MHz to 2500MHz) data was showed.				
Test site:	Measurement Distance: 3m				
Receiver setup:	Frequency	Detector	RBW	VBW	Value
	Above 1GHz	Peak	1MHz	3MHz	Peak
		RMS	1MHz	3MHz	Average
Limit:	Frequency		Limit (dBuV/m @3m)		Value
	Above 1GHz		54.00		Average
			74.00		Peak
Test setup:					
Test Procedure:	<ol style="list-style-type: none"> 1. The EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation. 2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. 3. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement. 4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rota table was turned from 0 degrees to 360 degrees to find the maximum reading. 5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. 6. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet. 7. The radiation measurements are performed in X, Y, Z axis positioning. And found the X axis positioning which it is worse case, only the test worst case mode is recorded in the report. 				
Test Instruments:	Refer to section 6.0 for details				
Test mode:	Refer to section 5.2 for details				
Test results:	Pass				

Measurement data:

Remark:

1. The pre-test were performed on lowest, middle and highest frequencies, only the worst case's (lowest and highest frequencies) data was showed.

Test channel:	Lowest
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Peak value:
Radiated Emission Measurement


Site	Polarization: Vertical	Temperature:
Limit: FCC Part15 (PK)	Power:	Humidity: %
EUT: bluetooth headset	Distance: 3m	
M/N: H1		
Mode: TX-L mode		
Note:		

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1	*	2310.000	56.55	-14.30	42.25	74.00	-31.75			peak
2		2390.000	54.77	-13.95	40.82	74.00	-33.18			peak



Radiated Emission Measurement

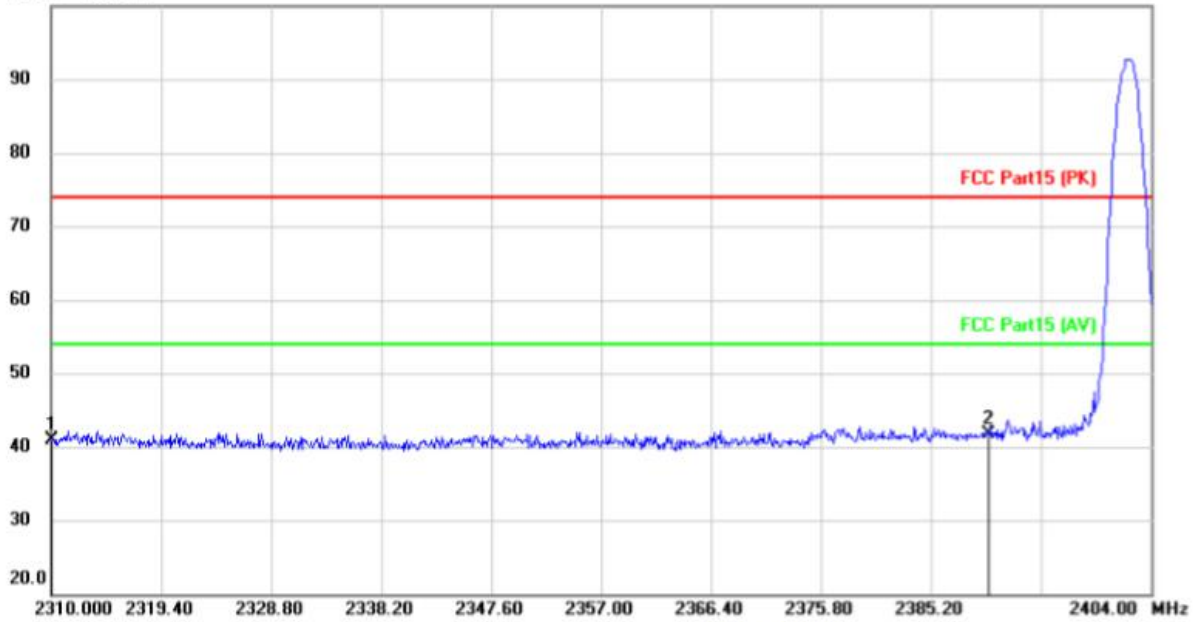
File :RE (3)

Data :#10

Date: 2020/10/9 星期

Time: 上午 10:17:31

100.0 dBuV/m



Site Polarization: *Horizontal* Temperature:
 Limit: FCC Part15 (PK) Power: Humidity: %
 EUT: bluetooth headset Distance: 3m
 M/N: H1
 Mode: TX-L mode
 Note:

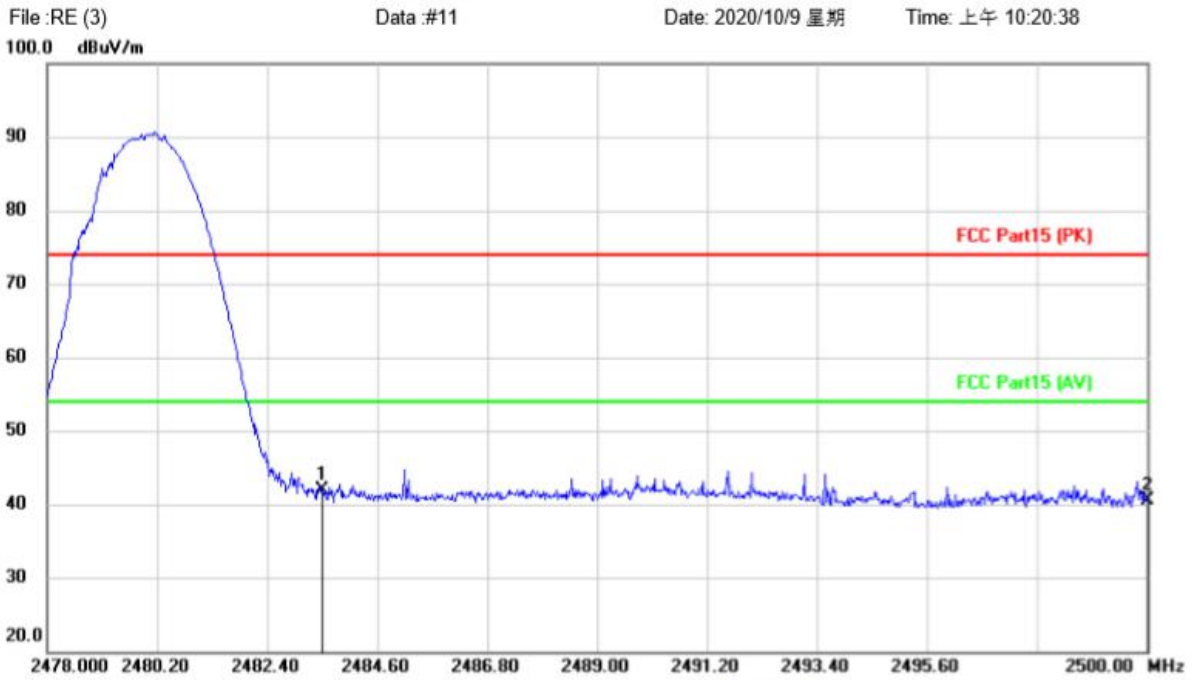
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Antenna Height cm	Table Degree degree	Comment
1		2310.000	54.93	-14.01	40.92	74.00	-33.08	peak		
2	*	2390.000	55.33	-13.62	41.71	74.00	-32.29	peak		



Test channel:	Highest
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Peak value:

Radiated Emission Measurement



Site	Polarization: Horizontal	Temperature:
Limit: FCC Part15 (PK)	Power:	Humidity: %
EUT: bluetooth headset	Distance: 3m	
M/N: H1		
Mode: TX-H mode		
Note:		

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Antenna Height cm	Table Degree degree	Comment
1	*	2483.500	55.11	-13.11	42.00	74.00	-32.00	peak			
2		2500.000	53.62	-13.02	40.60	74.00	-33.40	peak			

Radiated Emission Measurement

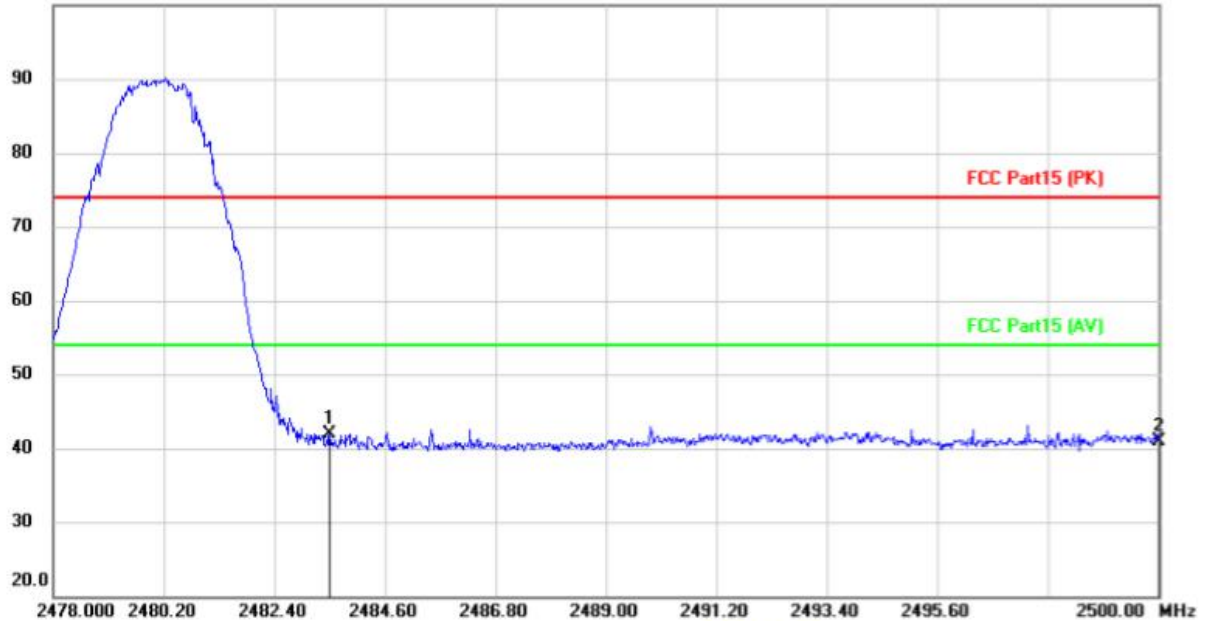
File :RE (3)

Data #12

Date: 2020/10/9 星期

Time: 上午 10:23:08

100.0 dBuV/m



Site	Polarization: Vertical	Temperature:
Limit: FCC Part15 (PK)	Power:	Humidity: %
EUT: bluetooth headset	Distance: 3m	
M/N: H1		
Mode: TX-H mode		
Note:		

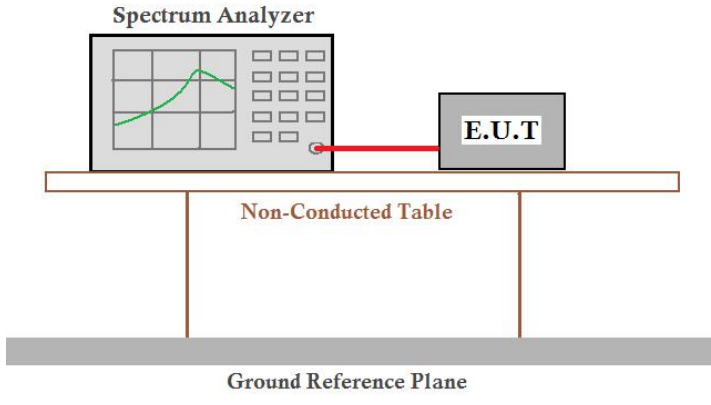
No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1	*	2483.500	55.33	-13.50	41.83	74.00	-32.17			peak
2		2500.000	54.34	-13.42	40.92	74.00	-33.08			peak

Remark:

- Final Level = Receiver Read level + Correct factor
- The emission levels of other frequencies are very lower than the limit and not show in test report.
- Correct factor = Antenna Factor + Cable Loss - Preamplifier Factor

7.7 Spurious Emission

7.7.1 Conducted Emission Method

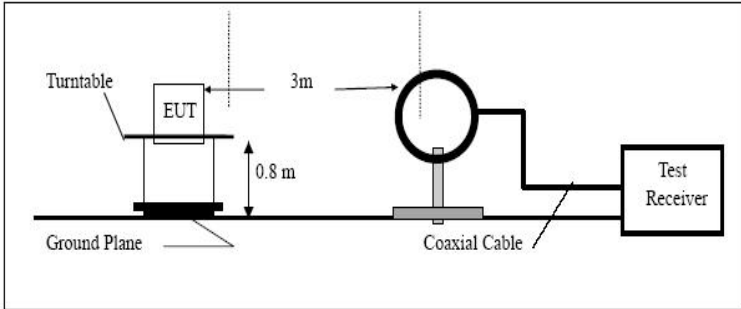
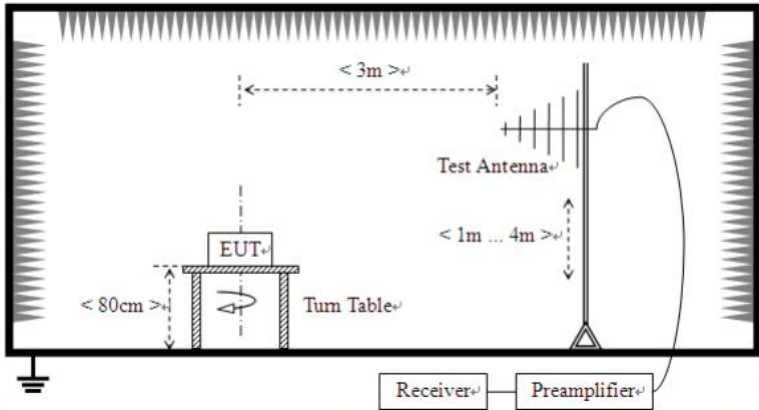
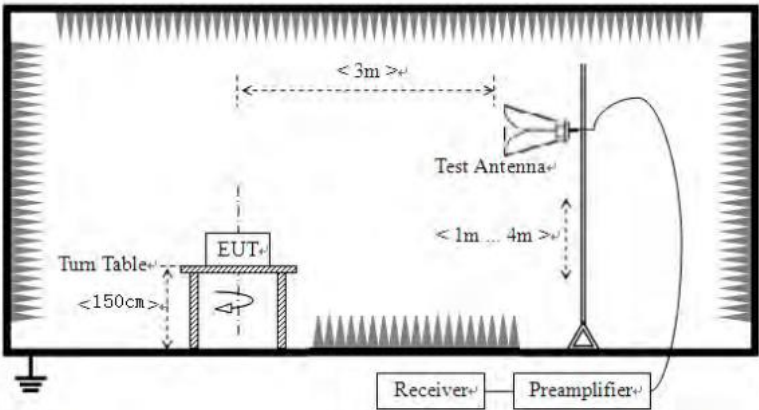
Test Requirement:	FCC Part15 C Section 15.247 (d)
Test Method:	ANSI C63.10:2013 and KDB558074 D01 DTS Meas Guidance V05
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.
Test setup:	 <p>The diagram illustrates the test setup. A Spectrum Analyzer is connected to an E.U.T. (Equipment Under Test) via a red cable. Both are placed on a Non-Conducted Table, which is supported by a Ground Reference Plane.</p>
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

Measurement Data

AppendixF:Conducted SpuriousEmission

7.7.2 Radiated Emission Method

Test Requirement:	FCC Part15 C Section 15.209				
Test Method:	ANSI C63.10:2013				
Test Frequency Range:	9kHz to 25GHz				
Test site:	Measurement Distance: 3m				
Receiver setup:	Frequency	Detector	RBW	VBW	Value
	9KHz-150KHz	Quasi-peak	200Hz	600Hz	Quasi-peak
	150KHz-30MHz	Quasi-peak	9KHz	30KHz	Quasi-peak
	30MHz-1GHz	Quasi-peak	120KHz	300KHz	Quasi-peak
	Above 1GHz	Peak	1MHz	3MHz	Peak
Peak		1MHz	10Hz	Average	
Limit: (Spurious Emissions)	Frequency	Limit (uV/m)	Value	Measurement Distance	
	0.009MHz-0.490MHz	2400/F(KHz)	QP	300m	
	0.490MHz-1.705MHz	24000/F(KHz)	QP	30m	
	1.705MHz-30MHz	30	QP	30m	
	30MHz-88MHz	100	QP	3m	
	88MHz-216MHz	150	QP		
	216MHz-960MHz	200	QP		
	960MHz-1GHz	500	QP		
	Above 1GHz	500	Average		
		5000	Peak		
Limit: (band edge)	Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in Section 15.209, whichever is the lesser attenuation.				

<p>Test setup:</p>	<p>Below 30MHz</p>  <p>Below 1GHz</p>  <p>Above 1GHz</p> 
<p>Test Procedure:</p>	<ol style="list-style-type: none"> 1. The EUT was placed on the top of a rotating table (0.8m for below 1G and 1.5m for above 1G) above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation. 2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. 3. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement. 4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters

	<p>and the rota table was turned from 0 degrees to 360 degrees to find the maximum reading.</p> <p>5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.</p> <p>6. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.</p>
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

Remark:

1. Pre-scan all kind of the place mode (X-axis, Y-axis, Z-axis), and found the Y-axis which it is worse case.
2. no emission found above 13G, so only show plots below 13G

Measurement Data

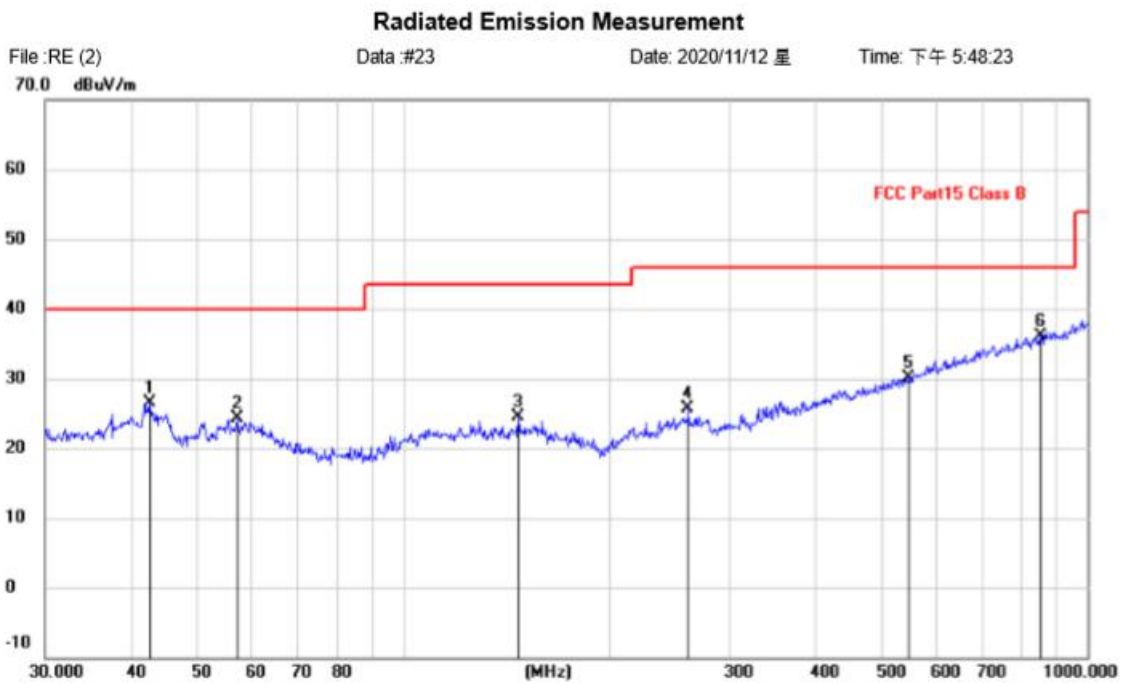
■ 9 kHz ~ 30 MHz

The low frequency, which started from 9 kHz to 30 MHz, was pre-scanned and the result which was 20 dB lower than the limit line per 15.31(o) was not reported.

Below 1GHz

Horizontal:

EUT:	bluetooth headset	Polarization:	Horizontal
Model:	H1	Power Source:	AC120V/60Hz
Mode:	BLE mode	Test by:	Eason
Temp./Hum.(%H):	23°C/49%RH		
Note:			

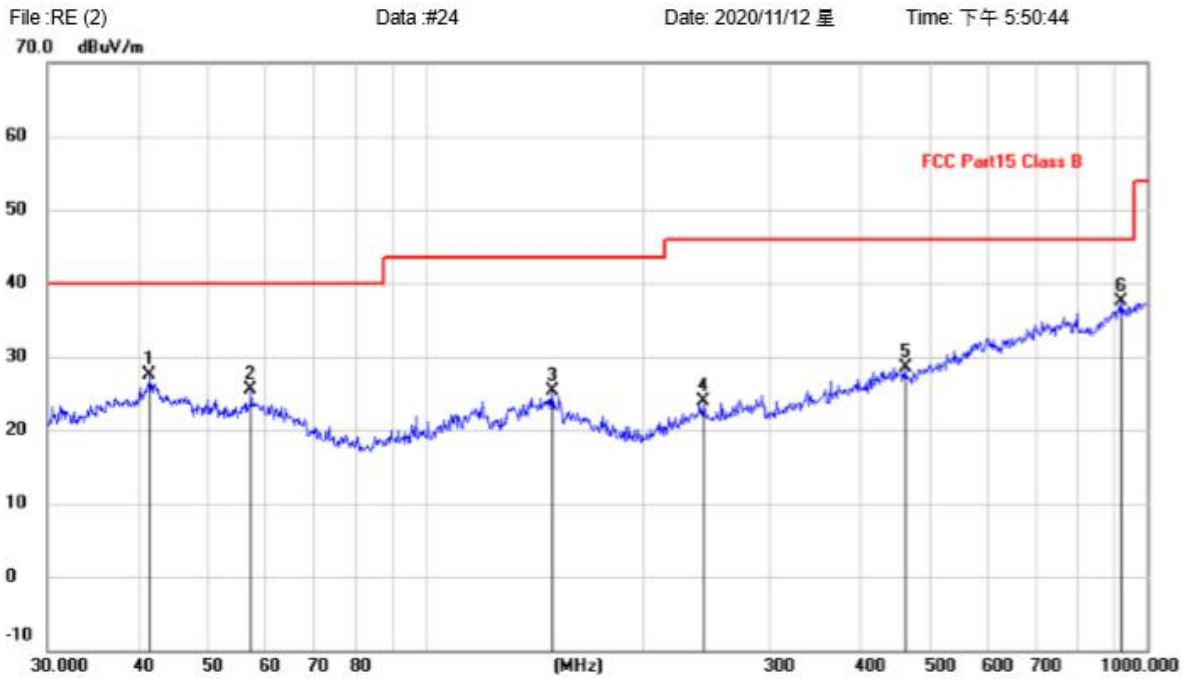


Site	Polarization: Horizontal	Temperature:
Limit: FCC Part15 Class B	Power: AC120V/60Hz	Humidity: %
EUT: bluetooth headset	Distance: 3m	
M/N: H1		
Mode: working mode		
Note:		

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1		42.6000	2.32	24.10	26.42	40.00	-13.58	QP		
2		57.1914	0.76	23.47	24.23	40.00	-15.77	QP		
3		147.4036	1.42	23.07	24.49	43.50	-19.01	QP		
4		261.0581	2.76	22.91	25.67	46.00	-20.33	QP		
5		547.0977	0.06	30.00	30.06	46.00	-15.94	QP		
6	*	854.0247	1.23	34.89	36.12	46.00	-9.88	QP		

Vertical:

EUT:	bluetooth headset	Polarization:	Vertical
Model:	H1	Power Source:	AC120V/60Hz
Mode:	BLE mode	Test by:	Eason
Temp./Hum.(%H):	23°C/49%RH		
Note:			

Radiated Emission Measurement


Site	Polarization: Vertical	Temperature:
Limit: FCC Part15 Class B	Power: AC120V/60Hz	Humidity: %
EUT: bluetooth headset	Distance: 3m	
M/N: H1		
Mode: working mode		
Note:		

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1		41.5670	3.45	24.07	27.52	40.00	-12.48	QP		
2		57.3922	2.07	23.45	25.52	40.00	-14.48	QP		
3		150.0107	2.30	23.06	25.36	43.50	-18.14	QP		
4		243.3771	1.02	22.93	23.95	46.00	-22.05	QP		
5		462.3455	0.35	28.24	28.59	46.00	-17.41	QP		
6	*	922.5157	1.85	35.60	37.45	46.00	-8.55	QP		

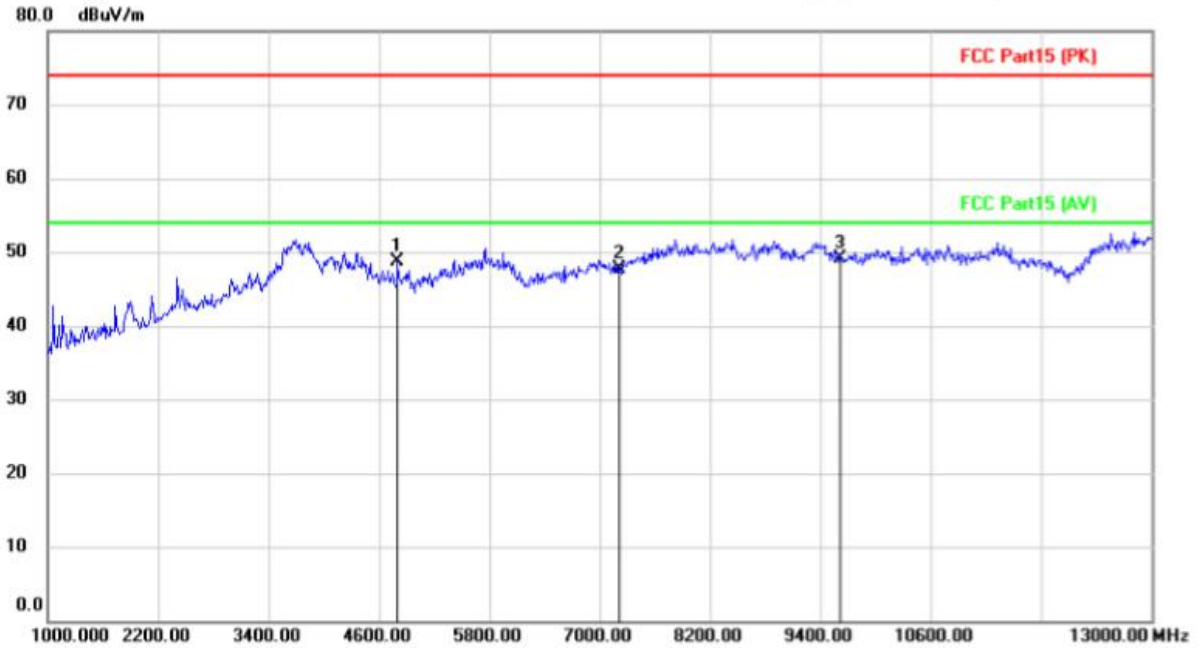
Above 1GHz

Test channel:	Lowest
---------------	--------

Peak value:

Radiated Emission Measurement

File :RE (3) Data :#18 Date: 2020/10/9 星期 Time: 上午 11:10:57



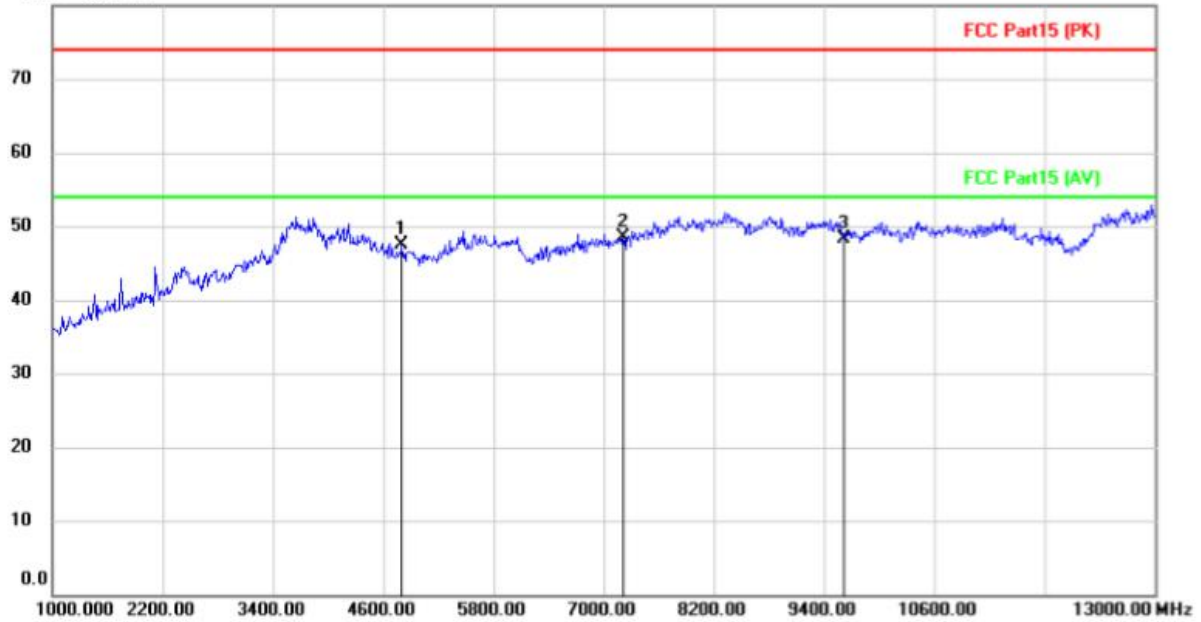
Site	Polarization: Vertical	Temperature:
Limit: FCC Part15 (PK)	Power:	Humidity: %
EUT: bluetooth headset	Distance: 3m	
M/N: H1		
Mode: TX-L mode		
Note:		

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Antenna Height cm	Table Degree degree	Comment
1		4804.000	53.26	-4.52	48.74	74.00	-25.26	peak			
2		7206.000	49.79	-2.02	47.77	74.00	-26.23	peak			
3	*	9608.000	48.46	0.62	49.08	74.00	-24.92	peak			



Radiated Emission Measurement

File :RE (3) Data :#17 Date: 2020/10/9 星期 Time: 上午 11:08:12
80.0 dBuV/m



Site: Polarization: **Horizontal** Temperature:
Limit: FCC Part15 (PK) Power: Humidity: %
EUT: bluetooth headset Distance: 3m
M/N: H1
Mode: TX-L mode
Note:

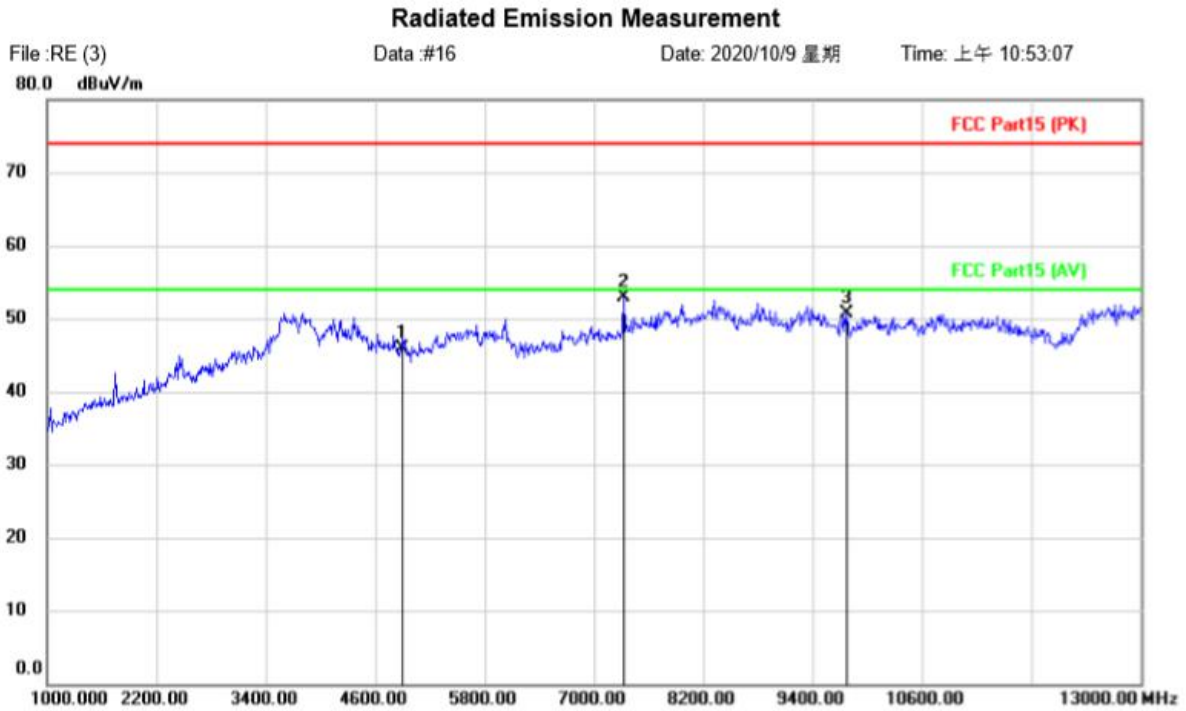
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Antenna Height cm	Table Degree degree	Comment
1		4804.000	51.99	-4.52	47.47	74.00	-26.53	peak			
2	*	7206.000	50.82	-2.27	48.55	74.00	-25.45	peak			
3		9608.000	47.54	0.81	48.35	74.00	-25.65	peak			

Remark:

1. Final Level = Receiver Read level + Correct factor
2. "*", means this data is the too weak instrument of signal is unable to test.
3. Correct factor = Antenna Factor + Cable Loss – Preamplifier Factor

Test channel:	Middle
---------------	--------

Peak value:

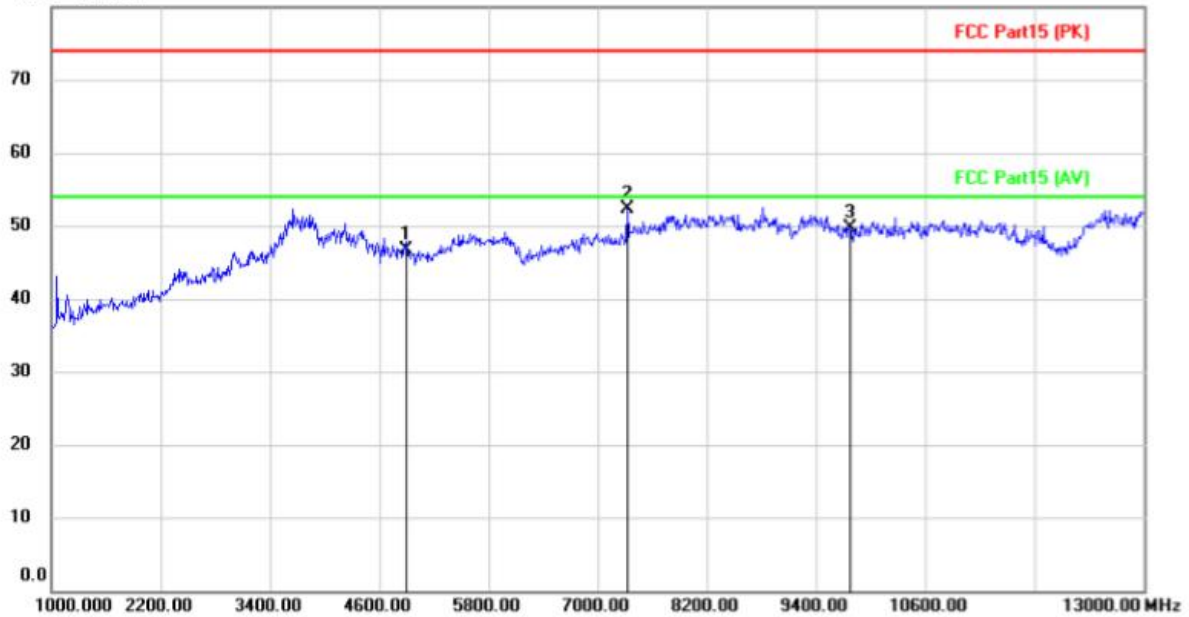


Site	Polarization: <i>Horizontal</i>	Temperature:
Limit: FCC Part15 (PK)	Power:	Humidity: %
EUT: bluetooth headset	Distance: 3m	
M/N: H1		
Mode: TX-M mode		
Note:		

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1		4882.000	50.99	-5.07	45.92	74.00	-28.08			peak
2	*	7323.000	54.27	-1.34	52.93	74.00	-21.07			peak
3		9764.000	49.81	0.94	50.75	74.00	-23.25			peak



Radiated Emission Measurement

 File :RE (3) Data #15 Date: 2020/10/9 星期 Time: 上午 10:52:04
 80.0 dBuV/m


Site	Polarization: Vertical	Temperature:
Limit: FCC Part15 (PK)	Power:	Humidity: %
EUT: bluetooth headset	Distance: 3m	
M/N: H1		
Mode: TX-M mode		
Note:		

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Antenna Height cm	Table Degree	Comment
1		4882.000	51.78	-5.07	46.71	74.00	-27.29	peak			
2	*	7323.000	53.78	-1.48	52.30	74.00	-21.70	peak			
3		9764.000	48.82	0.91	49.73	74.00	-24.27	peak			

Remark:

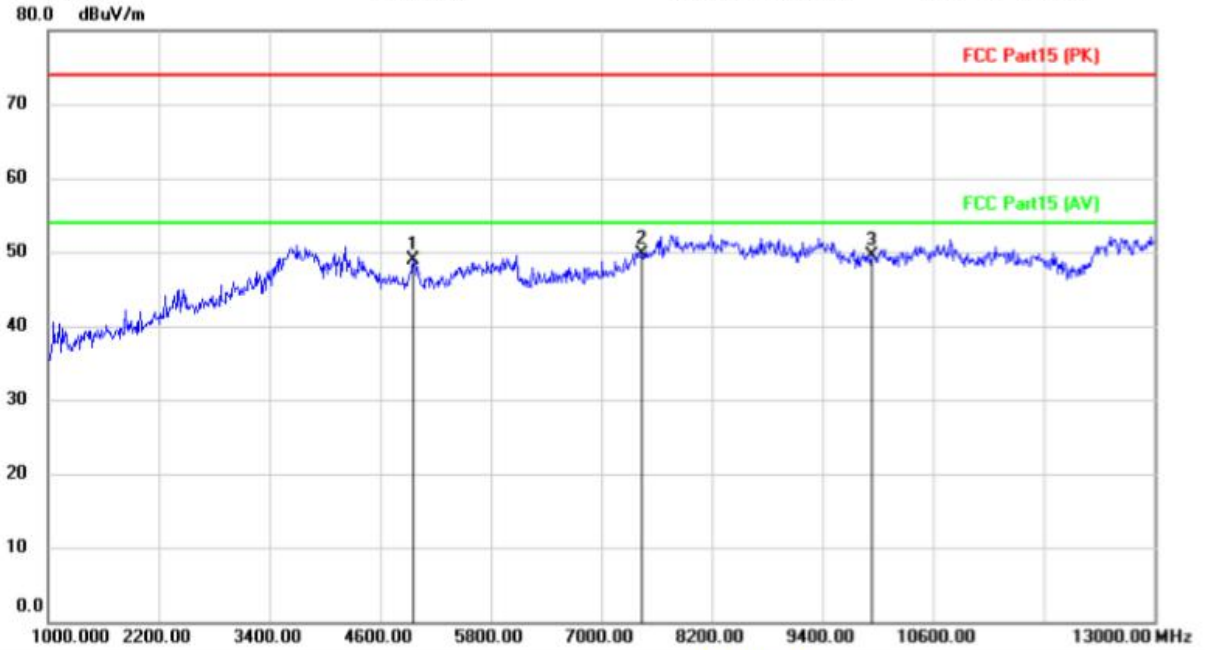
1. Final Level = Receiver Read level + Correct factor
2. "*", means this data is the too weak instrument of signal is unable to test.
3. Correct factor = Antenna Factor + Cable Loss - Preamplifier Factor

Test channel: Highest

Peak value:

Radiated Emission Measurement

File :RE (3) Data :#14 Date: 2020/10/9 星期 Time: 上午 10:38:32

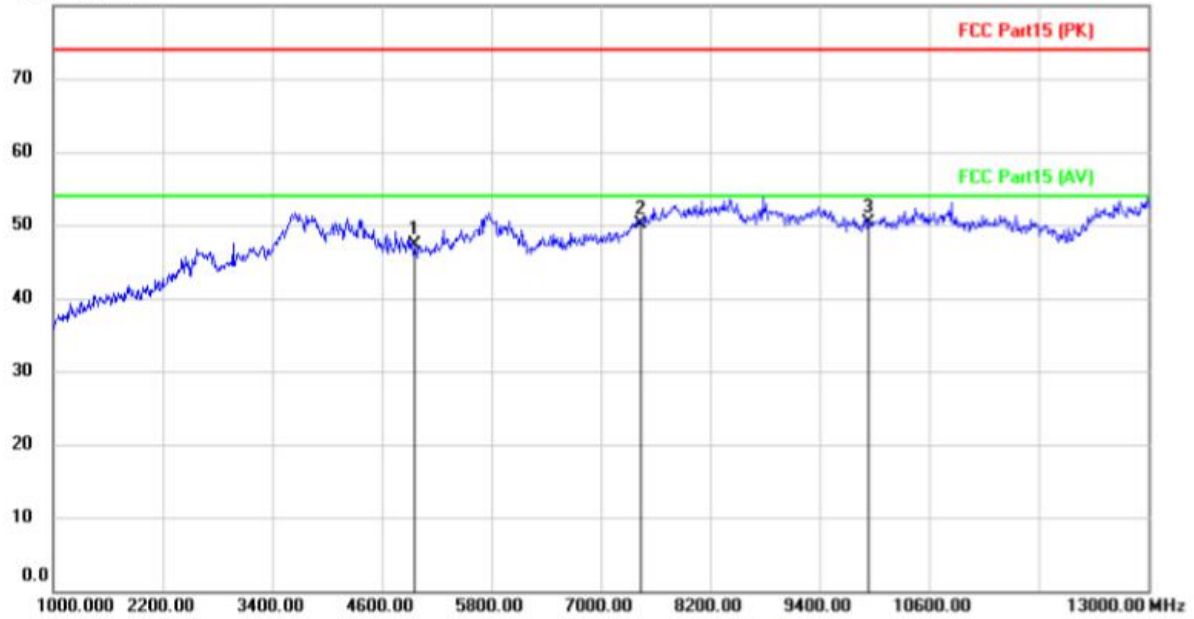


Site: Polarization: **Vertical** Temperature:
 Limit: FCC Part15 (PK) Power: Humidity: %
 EUT: bluetooth headset Distance: 3m
 M/N: H1
 Mode: TX-H mode
 Note:

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Antenna Height cm	Table Degree	Comment
1		4960.000	53.83	-4.84	48.99	74.00	-25.01	peak			
2	*	7440.000	50.80	-1.07	49.73	74.00	-24.27	peak			
3		9920.000	48.05	1.42	49.47	74.00	-24.53	peak			



Radiated Emission Measurement

 File :RE (3) Data :#13 Date: 2020/10/9 星期 Time: 上午 10:36:55
 80.0 dBuV/m


Site	Polarization: Horizontal	Temperature:
Limit: FCC Part15 (PK)	Power:	Humidity: %
EUT: bluetooth headset	Distance: 3m	
M/N: H1		
Mode: TX-H mode		
Note:		

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Antenna Height cm	Table Degree degree	Comment
1		4960.000	52.10	-4.84	47.26	74.00	-26.74	peak			
2		7440.000	50.64	-0.56	50.08	74.00	-23.92	peak			
3	*	9920.000	49.10	1.30	50.40	74.00	-23.60	peak			

Remark:

1. Final Level = Receiver Read level + Correct factor.
2. "**", means this data is the too weak instrument of signal is unable to test.
3. Correct factor = Antenna Factor + Cable Loss – Preamplifier Factor.

8 Test Setup Photo

Reference to the test report No. BLA-EMC-202009-A81-01

BlueAsia

9 EUT Constructional Details

Reference to the test report No. BLA-EMC-202009-A81-01

BlueAsia

10 Appendix

Refer to the following attachments.

*** End of Report ***

The test report is effective only with both signature and specialized stamp, The result(s) shown in this report refer only to the sample(s) tested. Without written approval of BlueAsia, this report can't be reproduced except in full.

BlueAsia

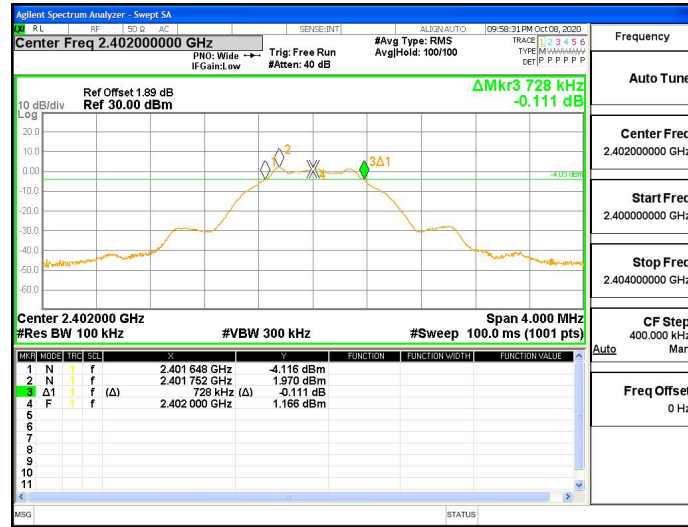
Appendix A: DTS Bandwidth

Test Result

TestMode	Antenna	Channel	DTS BW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
BLE_BT4.0	Ant1	2402	0.728	2401.648	2402.376	≥ 0.5	PASS
		2442	0.724	2441.648	2442.372	≥ 0.5	PASS
		2480	0.720	2479.652	2480.372	≥ 0.5	PASS

Test Graphs

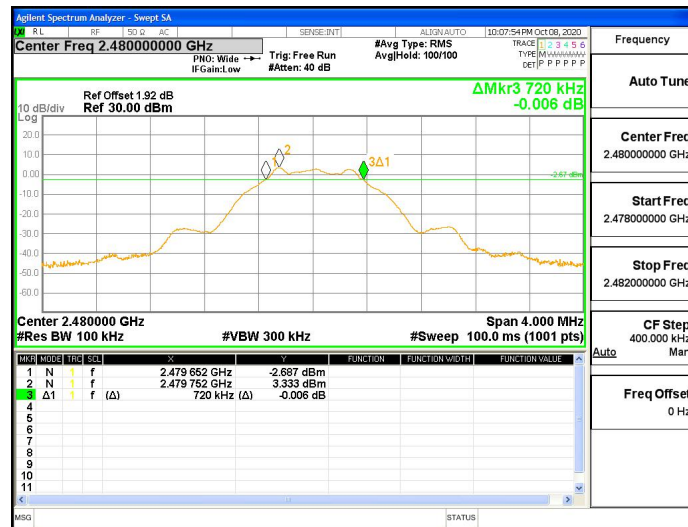
BLE_BT4.0_Ant1_2402



BLE_BT4.0_Ant1_2442



BLE_BT4.0_Ant1_2480



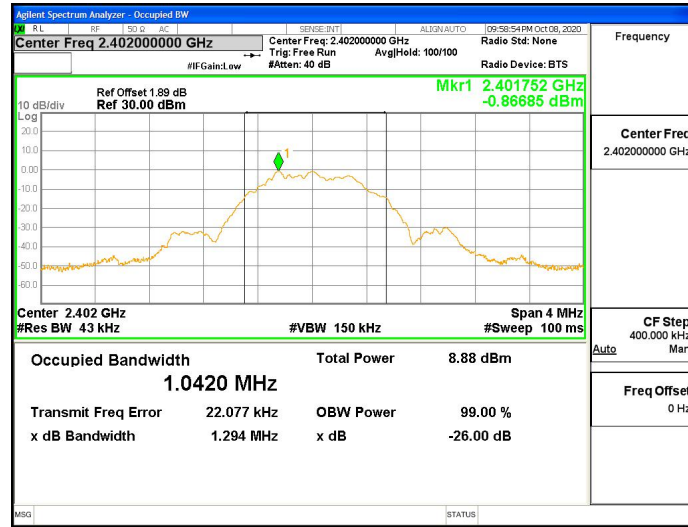
Appendix B: Occupied Channel Bandwidth

Test Result

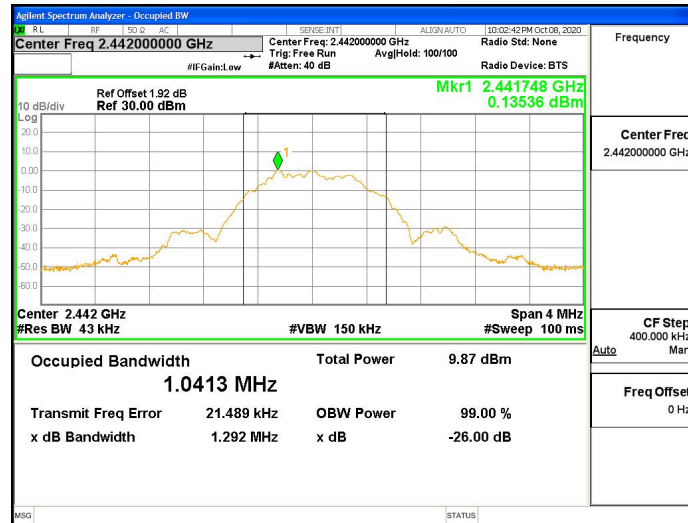
TestMode	Antenna	Channel	OCB [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
BLE_BT4.0	Ant1	2402	1.0420	2401.501	2402.543	---	PASS
		2442	1.0413	2441.501	2442.542	---	PASS
		2480	1.0391	2479.502	2480.541	---	PASS

Test Graphs

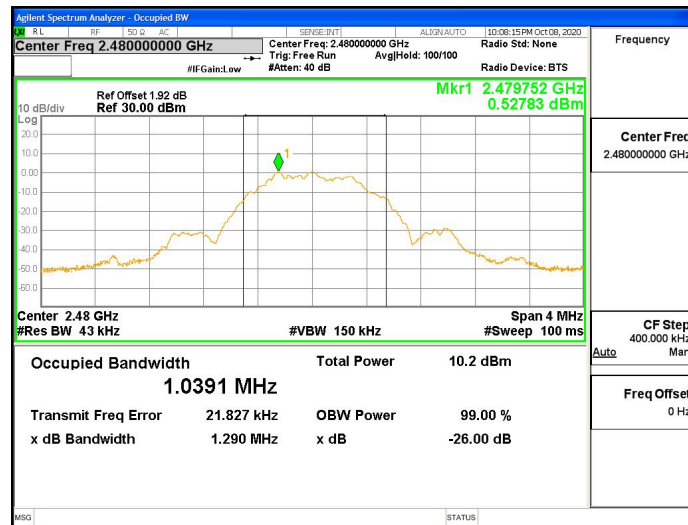
BLE_BT4.0_Ant1_2402



BLE_BT4.0_Ant1_2442



BLE_BT4.0_Ant1_2480



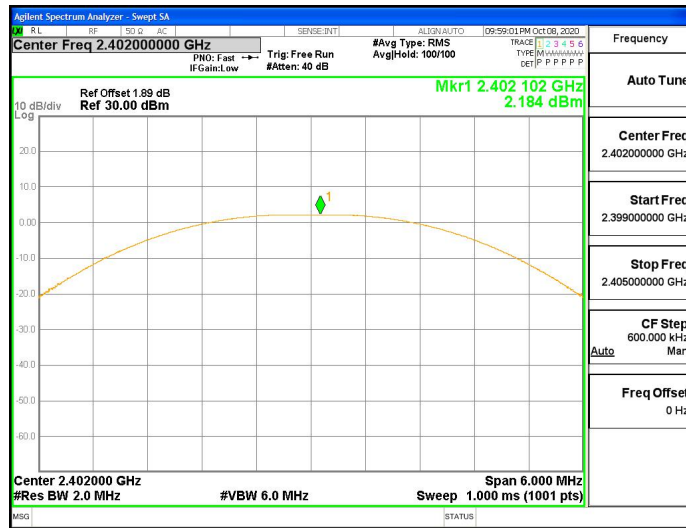
Appendix C: Maximum conducted output power

Test Result

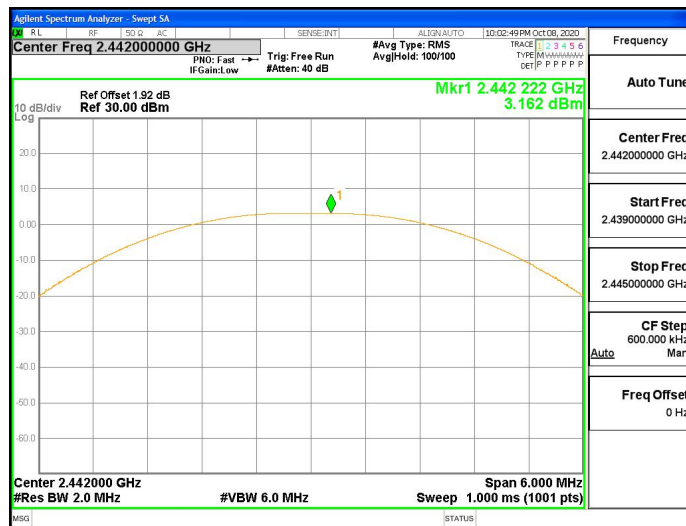
TestMode	Antenna	Channel	Result[dBm]	Limit[dBm]	Verdict
BLE_BT4.0	Ant1	2402	2.18	<=30	PASS
		2442	3.16	<=30	PASS
		2480	3.51	<=30	PASS

Test Graphs

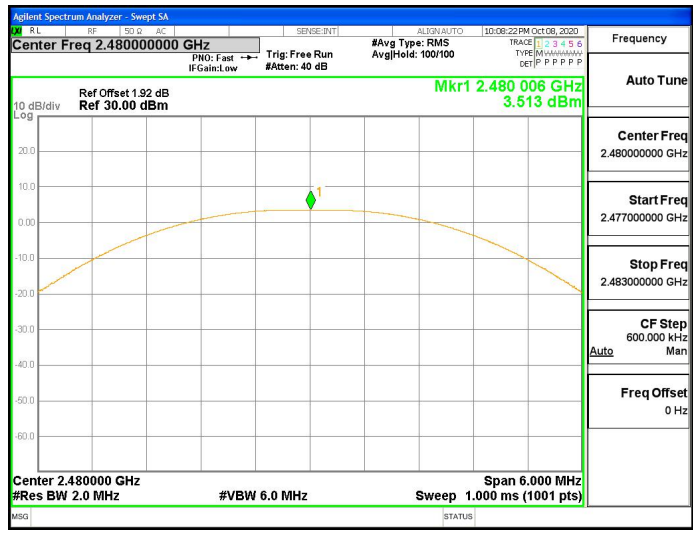
BLE_BT4.0_Ant1_2402



BLE_BT4.0_Ant1_2442



BLE_BT4.0_Ant1_2480



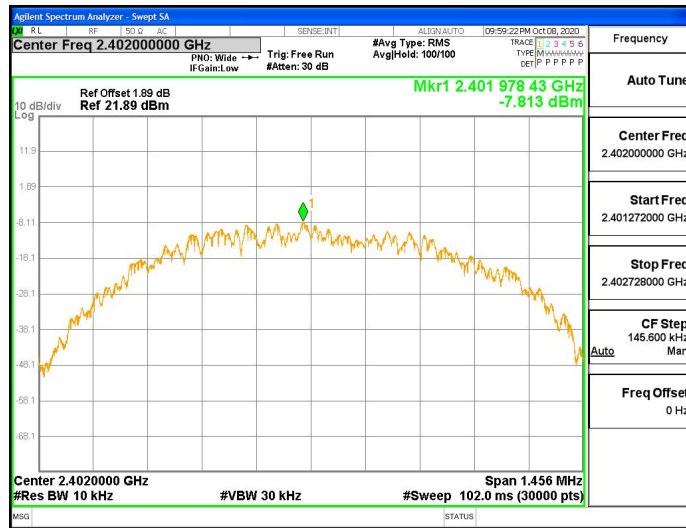
Appendix D: Maximum power spectral density

Test Result

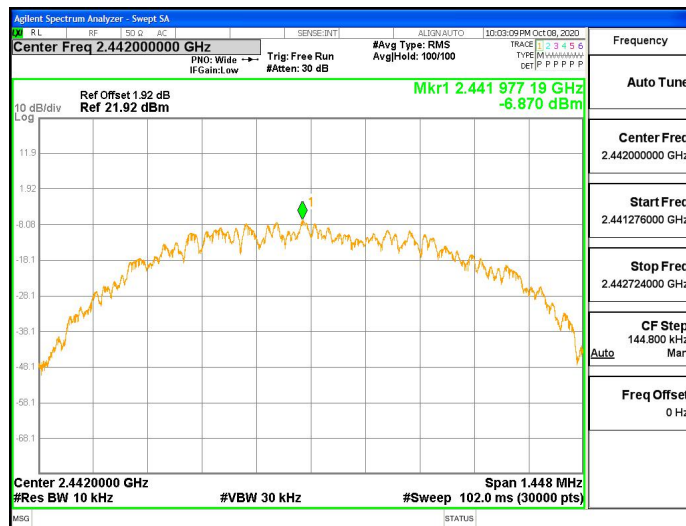
TestMode	Antenna	Channel	Result[dBm/3-100kHz]	Limit[dBm/3kHz]	Verdict
BLE_BT4.0	Ant1	2402	-7.81	<=8	PASS
		2442	-6.87	<=8	PASS
		2480	-6.35	<=8	PASS

Test Graphs

BLE_BT4.0_Ant1_2402



BLE_BT4.0_Ant1_2442



BLE_BT4.0_Ant1_2480



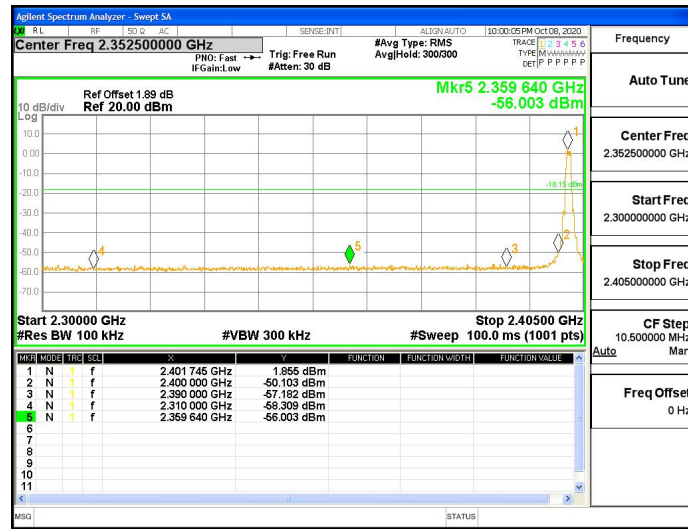
Appendix E: Band edge measurements

Test Result

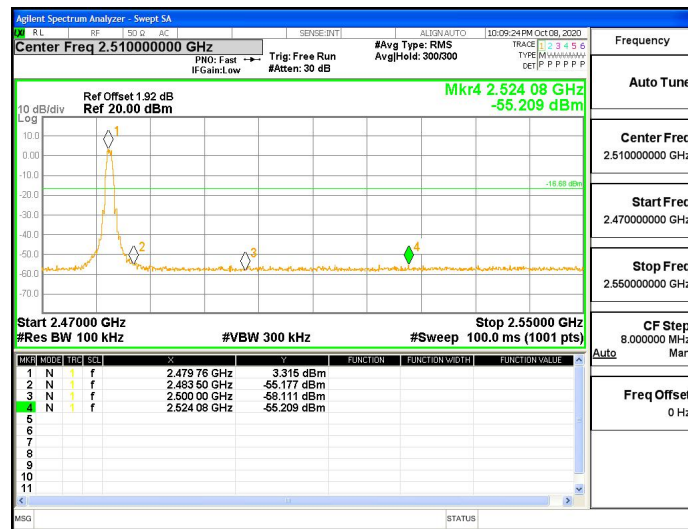
TestMode	Antenna	ChName	Channel	RefLevel[dBm]	Result[dBm]	Limit[dBm]	Verdict
BLE_BT4.0	Ant1	Low	2402	1.86	-56	<=-18.15	PASS
		High	2480	3.32	-55.21	<=-16.68	PASS

Test Graphs

BLE_BT4.0_Ant1_Low_2402



BLE_BT4.0_Ant1_High_2480



Appendix F: Conducted Spurious Emission

Test Result

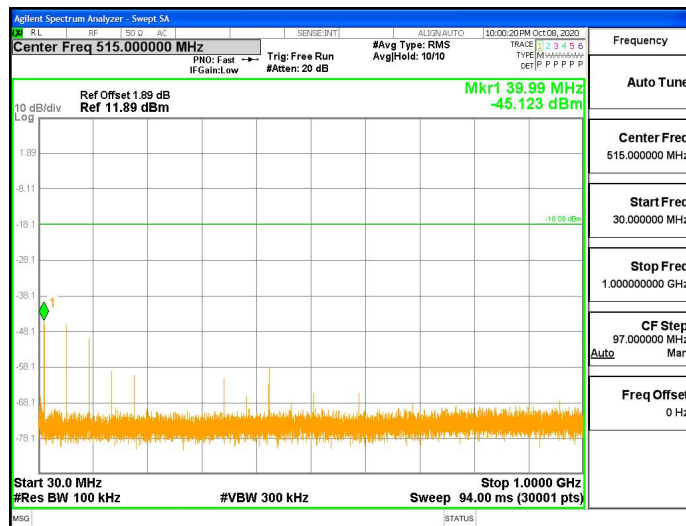
TestMode	Antenna	Channel	FreqRange [MHz]	RefLevel [dBm]	Result[dBm]	Limit[dBm]	Verdict
BLE_BT4.0	Ant1	2402	Reference	1.92	1.92	---	PASS
			30~1000	30~1000	-45.123	<=-18.085	PASS
			1000~26500	1000~26500	-53.074	<=-18.085	PASS
		2442	Reference	2.83	2.83	---	PASS
			30~1000	30~1000	-48.284	<=-17.169	PASS
			1000~26500	1000~26500	-48.838	<=-17.169	PASS
		2480	Reference	3.29	3.29	---	PASS
			30~1000	30~1000	-48.241	<=-16.713	PASS
			1000~26500	1000~26500	-47.449	<=-16.713	PASS

Test Graphs

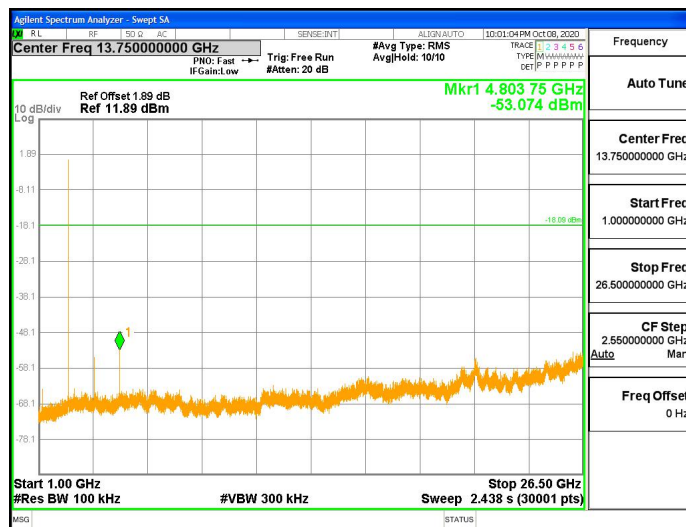
BLE_BT4.0_Ant1_2402_0~Reference



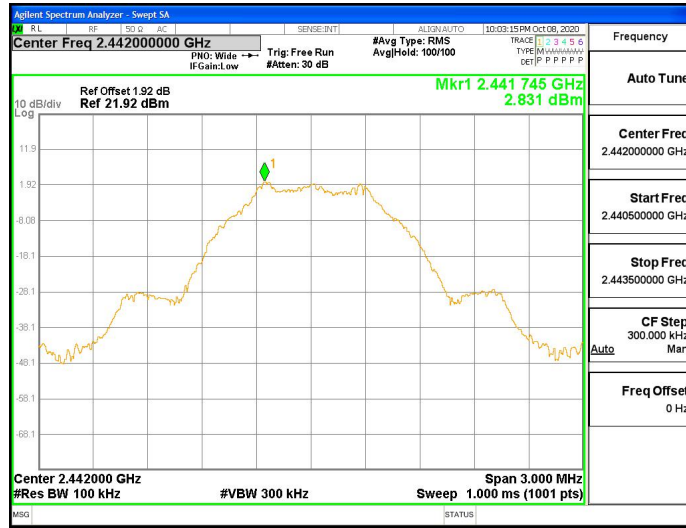
BLE_BT4.0_Ant1_2402_30~1000



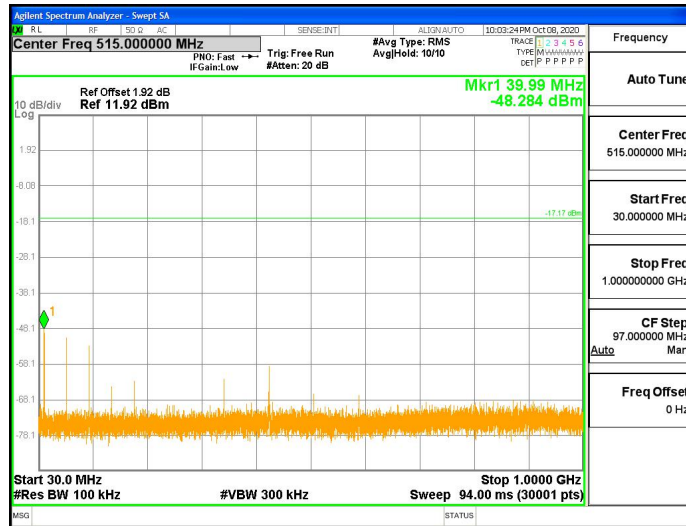
BLE_BT4.0_Ant1_2402_1000~26500



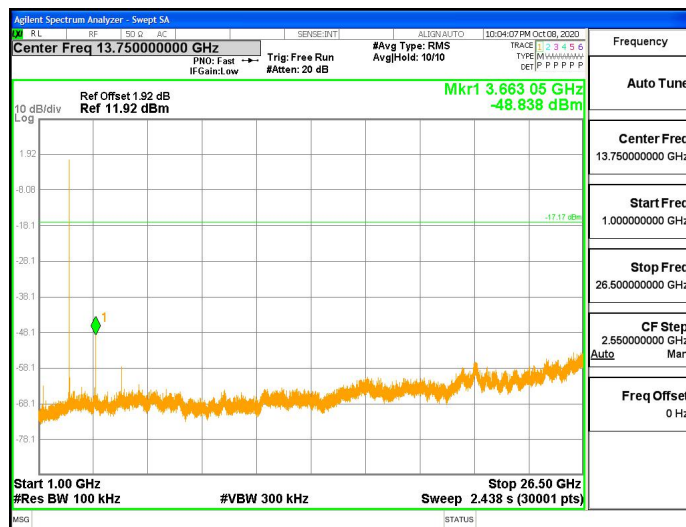
BLE_BT4.0_Ant1_2442_0~Reference



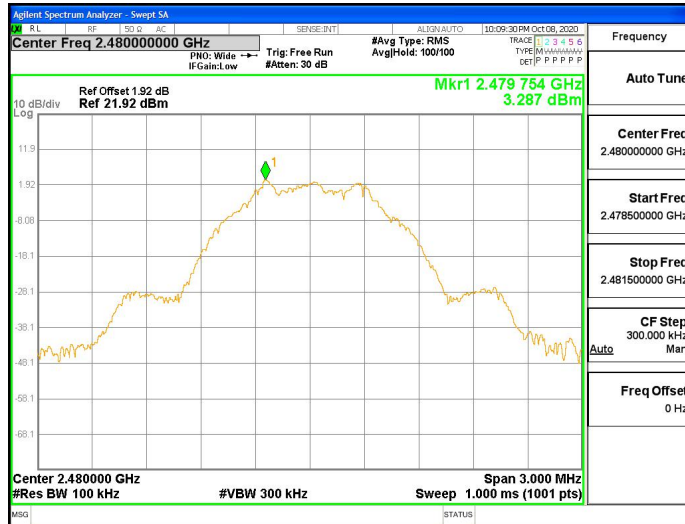
BLE_BT4.0_Ant1_2442_30~1000



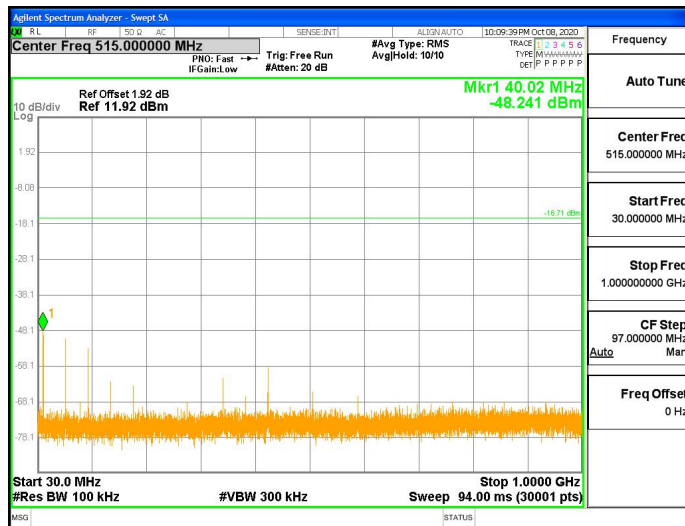
BLE_BT4.0_Ant1_2442_1000~26500



BLE_BT4.0_Ant1_2480_0~Reference



BLE_BT4.0_Ant1_2480_30~1000



BLE_BT4.0_Ant1_2480_1000~26500

